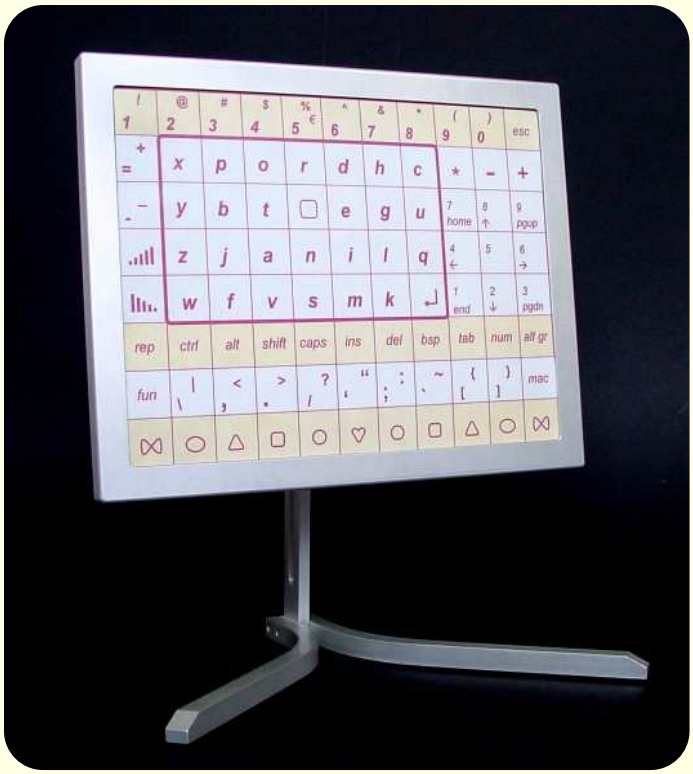
Shannon



LUCY

Keyboard and mouse

User manual
version 2.0 US

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INTRODUCTION

LUCY enables people who cannot handle an ordinary keyboard to use a personal computer. There are several control methods, such as laser, mouse, trackball and switch control. The output to the computer includes all possibilities of the normal keyboard and the mouse.

Overview
Chapter 2 gives a concise overview of the available control methods and the recommended keyboard overlay.

Control methods
Chapter 3 addresses one by one the different control methods that can be used with LUCY. For each control method, the most important functions are discussed.

Macros
Chapter 4 introduces the use of so-called macros. It is possible to store frequently used words, sentences or control tasks in the memory of LUCY. Such a stored word or sentence is called a macro. The stored item can be called back with only one or two selections. Working with macros is simple and can save a lot of time.

Mouse output to computer
Chapter 5 treats all LUCY functions which are related to using the numerical keypad as a mouse.

Functions and symbols overview
Chapter 6 contains an overview of all special LUCY symbols and all functions which can be used by means of the symbol *fun*.

The LUCY program
In chapter 7 the use and advantages of the supplied computer program that can be used in association with LUCY are discussed.

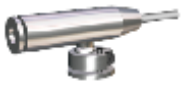
Installing and connecting LUCY
Chapter 8 gives an overview of the connections on the back of LUCY and describes the installation procedure. This chapter needs only to be read at first use or when another overlay number is chosen.

2. GENERAL OVERVIEW

2.1 CONTROL METHODS

Direct selection
To be able to select one of the 88 cells on the keyboard overlay a number of control methods is available. Direct selection with a laser pointer by means of head movements is the fastest and most comfortable control method. In some cases control with a mouse or a trackball can be a good alternative.

Laser pointer
The laser pointer is a laser light in the shape of a small tube that can be attached to a headband or to a pair of spectacles. The pointer throws a clear light spot on the keyboard overlay. Photosensitive cells in LUCY ensure that the chosen characters are passed on to the computer. For users who can move their head reasonably well, laser control is the best control method. The achievable speed is higher and the use is much less tiring than working with an on-screen system or head stick. The laser pointer can also be used handheld. In that case the achievable speed will be somewhat lower.



Mouse
LUCY has a connection for a normal USB computer mouse. Moving the mouse will result in the lighting up of the LEDs behind the characters on the keyboard overlay. As soon as the LED behind the chosen character lights up, the character can be sent to the computer by a mouse click. To be able to use a mouse, the user should be reasonably proficient with arm and hand. In some cases a considerable improvement can be reached by mounting a suitable handle on the mouse. The supplier of LUCY can advise you on such an adaption.

Trackball
Instead of a mouse, an USB trackball can be connected to LUCY. A trackball is a ball in a holder which can be rolled with small finger movements. The movements of the ball correspond with the lighting up of the LEDs behind the characters on the front of LUCY. As soon as the correct character has been selected, this can be sent to the computer. Because the trackball has a fixed place on the table, this method can be used by people with only minimal motor control over arm and hand.

2.1 CONTROL METHODS (continued)

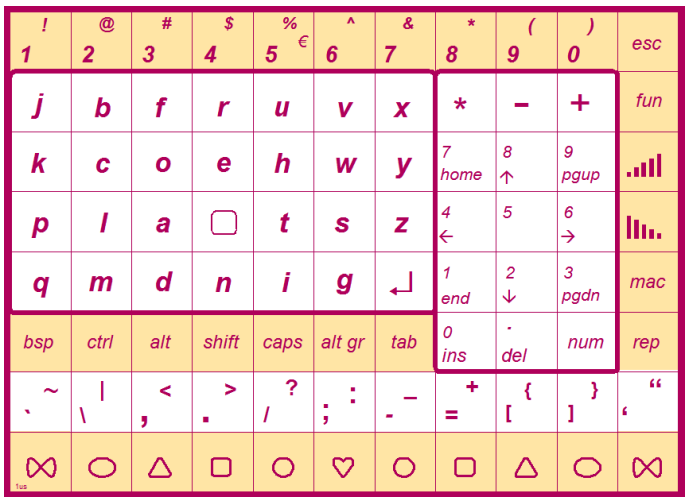
Step by step selection
Step by step selection by means of one or two control switches makes minimum demands on the motion ability of the user. In nearly all cases with only a very small motility, a solution can be found with switch control. The disadvantage is the relatively low speed. Before deciding for this solution it is recommended to try other control methods first.

Two- switch
With this method, two switches are used to control LUCY. The first switch serves to select one of the rows; the second switch is used to select the character within the row. Each time the row-switch is pressed, the next row of lights will light up. When the desired row is reached, the lights within this row can be switched on one by one, by pressing the character switch repeatedly. As soon as the desired character lights up, pressing the row-switch again will send the character to the computer.

One-Switch
With the use of a simple switch for the control of LUCY, the LEDs behind the characters light up automatically row after row. After activating the switch as soon as the desired row is lighted, each character in the selected row will light up sequentially. By activating the switch again as soon as the desired character lights up, this character will be sent to the computer.

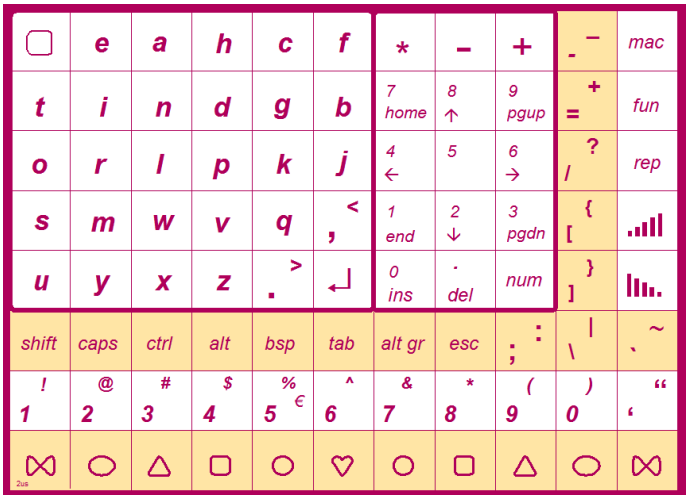
2.2 CHOICE OF KEYBOARD OVERLAY

There are two types of keyboard overlay available. Overlay no. 1 is intended for direct selection with laser pointer, mouse or trackball. Overlay no. 2 is intended for step-by-step selection with one or two switches. Although each overlay can be used with each control method, deviation from the recommended combinations inevitably results in a loss of speed and of comfort. The overlays are separately available and can simply be exchanged.


! 1
@ 2
# 3
$ 4
% 5 €
^ 6
& 7
* 8
(9
) 0
esc
j b f r u v x * - + fun
k c o e h w y 7 home 8 ↑ 9 pgup
p l a t s z 4 ← 5 6 →
q m d n i g 1 end 2 ↓ 3 pgdn mac
bsp ctrl alt shift caps alt gr tab 0 ins . del num rep
~ ` | \ < , > . ? / : ; _ - + = { [}] “ ‘

Overlay no. 1. Laser indicator, mouse or trackball control

The layout of the characters on the overlays has been optimised for the English language. With normal text the average distance between the characters is as small as possible. The space is the most used symbol and is placed approximately in the middle of the character matrix on overlay no.1. The 8 most used characters are placed directly around the space. This matrix of 9 symbols contains almost three quarters of all characters in normal text.



Overlay no. 2. Switch control

Overlay no. 2 is primarily intended for switch control. Because with this method choosing characters starts always top left, the space is placed in this top left cell. The most used characters are placed directly around the space. The less frequently a character occurs, the larger is the distance to the space symbol.

2.3 CONNECTION WITH THE COMPUTER

USB connection
LUCY is linked with the computer by a single USB cable. This cable allows the transfer of all required signals to the computer for both the LUCY keyboard and mouse-output and also acts as the power supply. If a standard keyboard and mouse are connected with the same computer, these can be used normally.

LUCY can function in combination with every personal computer without a special computer program. All important control functions of LUCY can be used.

A disadvantage of the use of LUCY without the special program is the lack of feedback to the user. Apart from a blinking LED behind the *return* ↵ symbol there is no indication whether LUCY works normally or is waiting for input. Therefore with LUCY a special supportive Windows program is provided.

LUCY program
It is recommended to load the LUCY program automatically after switching on the computer. In the lower right hand corner of the screen appears an icon as a sign that the program is active. The program can only be started when LUCY is connected to the computer. Some properties of the program are:

- As soon as a control function of LUCY becomes active, a small screen appears with instructions. After the settings have been modified, the screen disappears automatically.

- Macros are programmable keys on LUCY which can save much time. LUCY itself can contain only a limited number of macros. With the LUCY program the number of macros can be extended indefinitely.

- The program contains an overview of all available LUCY control functions with a short explanation.

- It is possible to recall an overview of all current LUCY settings and to change these settings as required.

- A user profile contains all settings and macros of a certain user. If several people use the same LUCY, they can store their profiles in the computer and simply retrieve them.

3. CONTROL METHODS

3.1 LASER CONTROL

Functioning
The laser pointer produces a clear red light spot with which the characters on the front of LUCY can be selected. After a character is illuminated during a certain time, LUCY sounds a short beep as a sign that the character has been accepted. The LED behind the character lights up shortly. The chosen character is now sent to the computer.

Target group
Laser control has been developed initially for people who can only use an ordinary keyboard using a head stick or a mouth stick. Laser control works a lot faster and is much less tiring. Also, in comparison with systems with which you control a cursor on a computer screen with head movements, laser control has advantages. Trying to work rapidly with such a pointing system, results in flickering and inertia of the cursor. Working with such a system for a prolonged time inevitably leads to fatigue and even headache. Laser control is not only much faster but can be used for a longer time without fatigue complaints.

The installation of the equipment
Main point for the installation of LUCY is a relaxed and comfortable posture for the user. The height must be such that from a relaxed and comfortable position one looks at approximately the middle of the overlay. It is recommended to place the computer monitor just beside LUCY. This facilitates back and forth looking between LUCY and the monitor.

The correct working distance
The recommended working distance lies between approximately 50 and 70 centimetres. The larger the distance, the smaller the required head movements. At large distances the head movements become so small, that sufficiently precise aiming of the laser becomes difficult.

Attaching the laser indicator
The attachment plate of the laser pointer can be attached to a headband or to a leg of a pair of glasses. For attaching the laser pointer one needs a screwdriver and the connection is not simply detachable. A little magnet keeps the indicator itself firmly in place in the ball joint and can be removed very simply. Extra attachment plates, for example for use with other glasses, are available at your dealer.

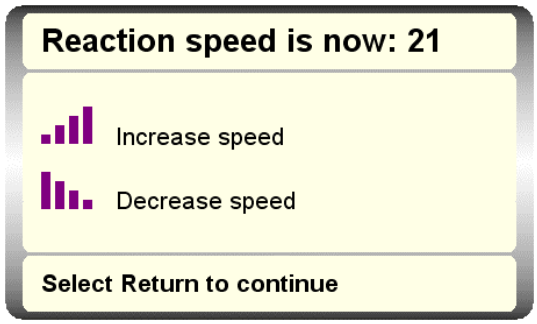
Aiming the laser pointer
The laser pointer is provided with a ball joint to enable pointing it in the right direction. The recommended manner for establishing the right direction is as follows: Look at the space symbol at the keyboard overlay in a relaxed and comfortable posture. Then aim the indicator at the space symbol. The locking screw at the side of the attachment plate should be unfastened. As soon as the correct direction has been found, the screw can be fastened carefully.

IMPORTANT CONTROL FUNCTIONS

Reaction speed

A certain amount of time passes between the moment the light spot falls on a character and the beep indicating that the character has been accepted. This delay makes it possible to take the shortest course to the next character without the intervening characters reacting to the passing of the spot. This reaction speed can be adjusted very simply. For optimal comfort it is important that the reaction speed is chosen not too large and not too small.

The two step-like symbols on the keyboard overlay are used for setting the reaction speed. The current setting is indicated on a small screen as soon as you aim the pointer at one of these symbols, and the LUCY program is active. The LED behind *return* ↵ will blink as a sign that LUCY is waiting for input. By aiming the indicator at one of the symbols, the reaction speed will change step-by-step.



As soon as the desired value is reached you can consolidate it by aiming the light spot at the *return* ↵ symbol. The correct setting can only be determined in practice because it varies from case to case. In most cases a suitable start value is 17. If one chooses the setting higher, the characters will react more rapidly to the light spot and a higher speed can be reached. However, the chance of errors occurring will increase. Certainly in the beginning it can be rewarding to experiment with the settings.

Repeating mode

If you select a character with the laser pointer, it will be sent to the computer only once, no matter how long the light spot touches the character. To select the same character twice, you first have to move away from the character.

In some cases is can be helpful to put LUCY in a repeating mode. Then, a selected character will be typed repeatedly. To set the repeating mode, you have to select the *rep* key on LUCY. The LED behind *rep* will light up. Selecting the *rep* key once again returns LUCY to the normal setting. Some experienced users keep their LUCY permanently in the repeating mode. This is a matter of personal preference. The step-like symbols for establishing the reaction speed are always repeating.

The repeat rate of the characters can be adjusted with Fun Rep. see page 24.

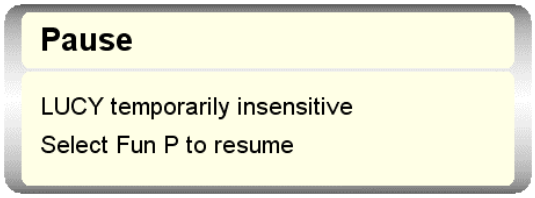
3.1 LASER CONTROL (continued)

fun **Function**

The function symbol is used to change certain settings of LUCY and also to use the function keys of a computer. After selecting the *fun* key, the LED behind it will light up to indicate that more characters or symbols must be selected. Chapter 6 contains a complete overview of all functions.

fun *p* **Pause**

After selecting these symbols LUCY becomes temporarily insensitive for the light spot. An information message appears on the screen. The LEDs behind the *fun* and *p* will light up as a sign that LUCY does not work normally. After four seconds the screen message disappears, so the entire screen can be read.

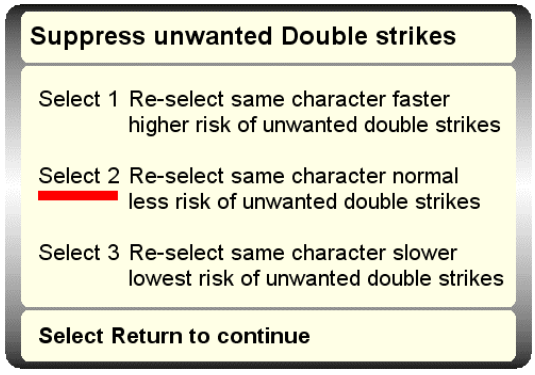


This way one can prevent uncontrolled selection of random characters during a rest pause. By selecting *fun* and *p* once again LUCY will return to the normal operating mode.

fun *d* **To suppress unwanted double strikes**

Sometimes a double character appears on screen although seemingly the character was only selected once. There is a simple explanation: when the light spot moves very rapidly from one character to the next, it sometimes overshoots the target character slightly before it comes to rest on the character, thus hitting and selecting it twice. This phenomenon is generally imperceptible to the eye but nevertheless occurs, especially in case of large and fast movements. To reduce unwanted double strikes you can raise the so-called double strike pause.

To select a character twice, the light spot has to leave the character and then return to it. The minimal time between the first and the second hit is called the double strike pause. This pause can be adjusted with *fun d*. After selecting *fun* and *d* a small screen appears in which a new value 1, 2 or 3 can be chosen. The LED behind *return* ↵ blinks as a sign that LUCY is waiting for a new setting. The larger the number, the longer the double touch pause will be. To fix the setting, you have to select *return* ↵. The most usual value for the pause is 2. A value of 1 has the advantage of faster selecting double characters. The disadvantage is a larger chance of unwanted double strikes. At a value of 3 one must wait somewhat longer before a character can be chosen once again, but the chance of unwanted double strikes is smallest.


Suppress unwanted Double strikes
Select 1 Re-select same character faster
higher risk of unwanted double strikes
Select 2 Re-select same character normal
less risk of unwanted double strikes
Select 3 Re-select same character slower
lowest risk of unwanted double strikes
Select Return to continue

3.2 MOUSE OR TRACKBALL CONTROL

Functionality
Because mouse control and trackball control show many similarities, both are dealt with in this chapter. Moving the mouse or the trackball results in consecutively lighting up of the LEDs behind the characters on the front of LUCY. As soon as the correct character lights up, it can be selected with a mouse click or with the button on the trackball. LUCY sounds a short beep to indicate that the character has been sent to the computer.

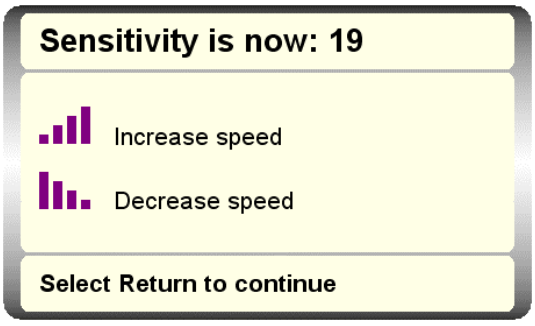
Target group
Mouse control is suitable for people with a reasonable proficiency of arm and/or hand. Because one can rest the arm on the table while working, this method is also suitable for people with little strength in their arms. The friction of the arm on the table will cushion any involuntary movements. This can be a good control method for spastic people too. If holding the mouse or using the switch poses any problems a suitable handle on the mouse can be supplied by your dealer.

A trackball stands at a fixed place on table. Moreover very little strength is necessary for back and forth rolling of the ball. Therefore this control method is very suitable for people with minimal motor control over the hands and the arm.

IMPORTANT CONTROL FUNCTIONS

Sensitivity

The size of the movement necessary to jump from one character to the next can be adjusted with the step-like symbols. As soon as you choose one of these symbols - and the LUCY program is active - the current setting is indicated on a small screen. The LED behind the *return* ↵ symbol blinks as a sign that LUCY is waiting for new input. As long as the switch on mouse or trackball remains pressed, the value is reduced or increased automatically.



As soon as the desired value is reached you can fix the setting by selecting *return* ↵. The correct setting can only be found in practice because it differs from case to case. A suitable start value for the mouse is 16.

For the trackball you can start with a setting in which the light can be sent from one side to the other side of LUCY without releasing the ball. Certainly in the beginning it can be rewarding to experiment with the settings.

3.2 MOUSE OR TRACKBALL CONTROL (continued)

Repeating mode

When you have selected a character with a mouse click or with the button of the trackball, only one character will be sent to the computer, regardless how long you keep the button pressed. To choose the same character again, you have to release the switch and then press it again. In some cases it can be helpful to put LUCY in repeating mode. If you keep the button pressed in this mode, the selected character will be typed repeatedly. To set the repeating mode, you have to select the *rep* key on LUCY. The LED behind *rep* will light up. Selecting the *rep* key once again returns LUCY to the normal setting. Some experienced users keep their LUCY permanently in the repeating mode. This is a matter of personal preference. The symbols for establishing the sensitivity are always repeating.

The repeat rate of the characters can be adjusted with Fun Rep. see page 24.

3.3 SWITCH CONTROL

Functionality
Because one and two-switch control show many similarities, both are dealt with in this chapter. When switch control is used, the characters on LUCY are selected in two steps. First the row in which the desired character resides has to be selected, then the character itself.

Two-switch control
After turning on, LUCY is in a state of rest, with all the LEDs turned off. As soon as the row-switch is briefly pressed, the LEDs behind the upper row of characters will light up. By pressing the row-switch again, the current row is switched off and the next row is switched on, and so on. When the desired row is reached, the lights within this row can be switched on one by one, by pressing the character-switch repeatedly. As soon as the desired character lights up, pressing the row-switch again will send the character to the computer. LUCY produces a short beep as a sign that the character has been accepted.
When the desired row is accidentally passed, one has to continue pressing the row-switch until the last row is passed. LUCY is then back to the state of rest.
When the desired character within a row is accidentally passed, one should continue pressing the character-switch until all lights are off. With the character-switch, the first symbol in the row will light up again. With the row-switch, the first row will be selected.

By keeping one of the switches pressed, LUCY will cycle through the rows or characters automatically.

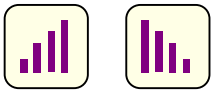
One-Switch control
After turning on, LUCY is in a state of rest, with all the LEDs turned off. As soon as the switch is briefly pressed, the LEDs behind the upper row of characters will light up. A moment later LUCY produces a click sound and the LEDs in the upper row are extinguished, while the LEDs in the second row are lighting up. Thereafter the third row, etc. To select a certain character, you have to wait till the row with that character lights up and than press the switch. After pressing the switch as soon as the desired row is lighted, each character in the selected row will light up sequentially. By pressing the switch again as soon as the desired character lights up, this character will be sent to the computer.
LUCY produces a short beep as a sign that the character has been accepted. If you react too late, so that the desired character is passed by, you do not have to press the switch again. After reaching the last character LUCY returns automatically to the first row.

The first row lights up twice as long as the next rows. This also applies to the first character from a row. This way choosing the first row or the first character from a row is possible without the need to switch very fast. If the switch is not pressed, LUCY goes through the lighting sequence five times before returning to the state of rest.

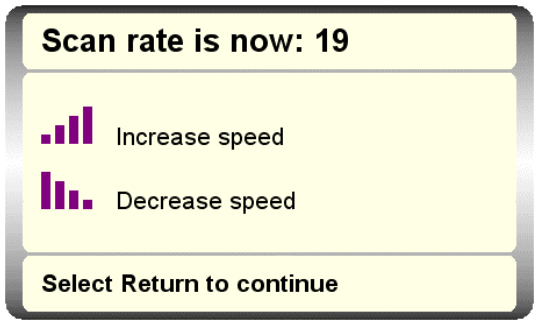
Target group
Step by step selection by means of a control switch makes minimum demands on the motion ability of the user. In nearly all cases with only a very small motility, a solution can be found with switch control. The disadvantage is the relatively low speed. Before deciding for this solution it is recommended to try other control methods first.

Control switches are available in many constructions, designs and types. There are miniature touch-sensitive switches that can be operated with extremely small movements. But there are also many sizes of push buttons, lever switches, blow switches, air cushion switches, etc..

IMPORTANT CONTROL FUNCTIONS



Scan rate



The scan rate, the speed with which the LEDs behind the characters light up, can be adjusted using the step-like symbols. As soon as you choose one of these symbols - and the LUCY program is active - the current setting is indicated on a small screen. The LED behind the *return* ↵ symbol blinks as a sign that LUCY is waiting for new input.

As soon as the desired value is reached you can fix the setting by selecting *return* ↵. The correct setting can only be found in practice because it differs from case to case and depends to a large extend on experience, fatigue, etc. A suitable start value for switch control is 19. Certainly in the beginning it can be rewarding to experiment with the scan rate settings.

Scan rate too high

If you choose the scan rate higher, the LEDs succession will be faster and the waiting time before the desired character has been reached will be shorter. However, it becomes more difficult to react in time when the desired row or character lights up. It is even possible to accidentally select a scan rate that makes it impossible to select any character or symbol at all. When this problem arises you can wait until the scanning stops and LUCY returns to the state of the rest. Then, by keeping the switch pressed down, the upper row will light up and extinguish after some time. The scan rate is now set to a lower value (default, 19).

Repeating mode

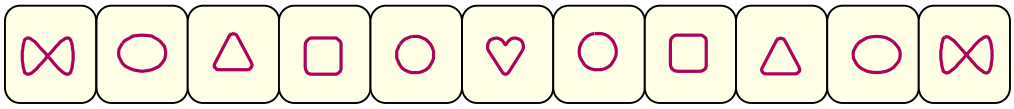
When you have selected a character by pressing the switch, only one character will be sent to the computer, regardless how long you keep the switch pressed. To choose the same character again, you have to release the switch and then start scanning again from the upper left. In some cases it can be helpful to put LUCY in a repeating mode. If you keep the switch pressed in this mode, the selected character will be typed repeatedly. To set the repeating mode, you have to select the *rep* key on LUCY. The LED behind *rep* will light up. Selecting the *rep* key once again returns LUCY to the normal setting. Some experienced users keep their LUCY permanently in the repeating mode. This is a matter of personal preference. The step-like symbols for establishing the scan rate are always repeating.

The repeat rate of the characters can be adjusted with Fun Rep. see page 24.

4. MACROS

Frequently used words, sentences or control tasks can be stored in a so-called macro. During the preparation of such a macro LUCY remembers all the selected symbols in the right order. The chosen items can simply be repeated afterwards as many times as you wish by selecting only one or two symbols. The contents of a macro are kept, even if LUCY is not used for a long time. LUCY knows two kinds of macros: simple macros, where the stored items can be repeated using only one symbol, and two-step macros, where two symbols are necessary to reproduce the item. Working with macros is very simple and can save a lot of time.

4.1 SIMPLE MACROS



The bottom row of the keyboard overlay contains a set of special symbols. On themselves these symbols have no particular meaning. The form has been chosen to distinguish them easily.

In addition to these special symbols, there is the symbol Mac, which is used for storing and erasing a macro.

How to store a macro

1. Select *mac*.
2. Select the special symbol with which you want to call back the macro.
3. Next select the string of characters you want to put in the macro.
4. Select *mac* once again.

As from this moment the macro is ready for use. To recall the macro you have only to select the matching symbol. While storing a macro, the LEDs under *mac* and under the selected symbol will light up. Apart from that, LUCY will behave exactly as usual. During storing, the string of characters and other symbols which will be in the macro, are simply sent to the computer. The special control functions of LUCY, preceded by the symbol *fun,* can also be incorporated in a macro.

How to erase a macro

1. Select *mac*.
2. Select *del*.
3. Select the symbol for the macro you want to erase.

The selected macro is now removed from the memory and the symbol can be used again. Choosing an 'empty' macro has no influence on the text which is sent to the computer.

4.2 TWO-STEP MACROS

Beside the simple macros, which can be called back by choosing a single symbol, LUCY also knows so-called two-step macros. Recalling two-step macros always starts with *mac*. Then a character or another symbol is selected (all characters and symbols are allowed except *del* and the special symbols in the bottom row).

How to store a two-step macro

1. Select *mac*.
2. Select the character with which you want to call back the macro.
3. Next select the string of characters you want to put in the macro.
4. Select *mac* once again.

How to recall a two-step macro

1. Select *mac*.
2. Select the matching character.

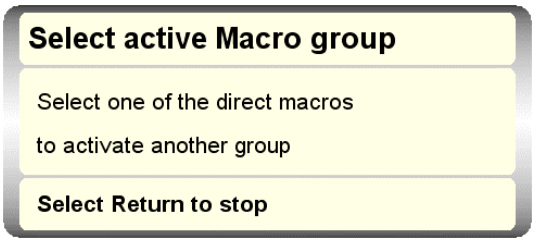
How to erase a two-step macro

1. Select *mac.*
2. Select *del.*
3. Select the matching character.

4.3 GROUPS OF MACROS

A keyboard overlay contains 88 cells. All symbols, except *mac* and *del*, can be used to store macros. Such a collection of 86 possible macros is called a macro group. When the LUCY program is active on the computer, it is possible to store a complete macro group on the computer and to replace it by another group. If you choose the symbol *fun* followed by *mac*, the next window will appear on the computer monitor:

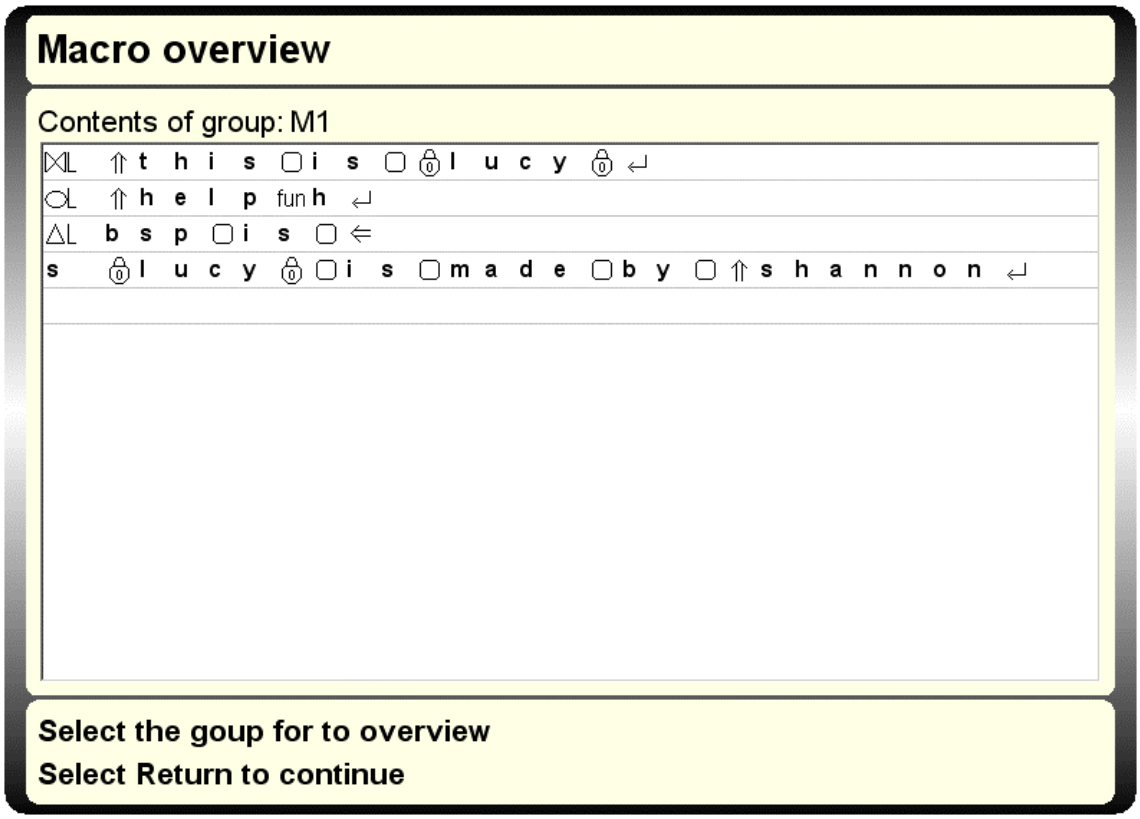
One of the macro symbols in the bottom row will also light up to indicate which macro group is active. By choosing another symbol from this row, the current group will be stored on the computer and the newly chosen group will be made active. After loading the new macro group LUCY will return to the normal mode.



If no new macro group has to be activated, you can leave the function by selecting the *return* ↵ symbol. When the LUCY program is not active on the computer, no new macro group can be loaded and the current group will stay active.

4.4 MACRO OVERVIEW

When a lot of macros are used, it can be difficult to remember which characters are used and what the content of the different macros is. To get a quick impression of the stored macro groups, you choose successively *fun* and *m*. An overview window appears with the contents of the current macro group. In the example it is group M3, the third group from the left.


Macro overview
Contents of group: M1
⋈L ⇑ t h i s ▢ i s ▢ l u c y ↵
◯L ⇑ h e l p fun h ↵
△L b s p ▢ i s ▢ ⇐
s l u c y ▢ i s ▢ m a d e ▢ b y ▢ ⇑ s h a n n o n ↵
Select the goup for to overview
Select Return to continue

The symbol at the beginning of each line is the symbol under which a macro has been stored. To distinguish between the left and the right symbols (which are identical in shape), an L or an R is added. All characters which are used, are shown as lower case letters.

The depiction of a number of symbols in the overview is somewhat different from the picture on the keyboard overlay. Some cells are shown as pictures.

agr	alt gr	+	The +, - and * from the num keypad
⇐	bsp	−	
0	caps	*	
⇑	shift	n1	The 1 till 9 from the num keypad
⇆	tab	n9	

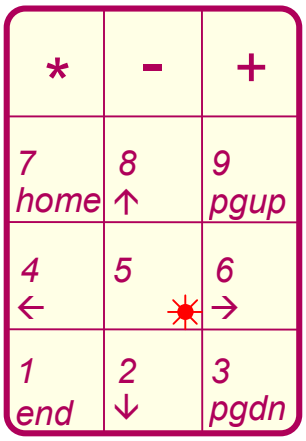
To examine the contents of another macro group, you can select the group concerned in the row of macro symbols. However, this only gives an overview of the contents of the other group. Exchanging active macro groups is only possible with *fun* and *mac*. The macro overview can be closed by selecting the *return* ↵ symbol.

5. MOUSE OUTPUT

The numerical keypad of LUCY can be used to imitate the functions of the ordinary computer mouse. This can be done in two ways: with identical steps or in a continuous movement. The differences are discussed below. By selecting successively the *fun* key and the 5 from the numerical keypad, the mouse output function can be switched on and off.

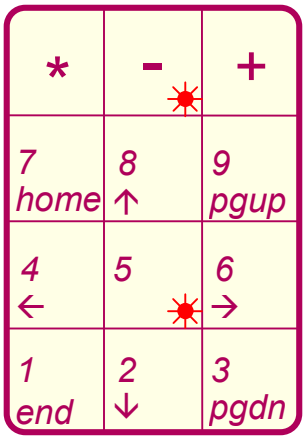
Mouse with identical steps
When the mouse output function is switched on, the LED behind the 5 will light up. The cells around the 5 are then used to move the mouse cursor on the computer monitor. The 8 moves the cursor up; the 6 moves the cursor to the right; the 7 moves the cursor to above and left; the 3 moves it to right under, etc.

Each time one of these boxes on LUCY is selected, the cursor steps in the indicated direction in equal steps.



Mouse with continuous movement
Some people prefer the mouse cursor moving continuously. In this mode the mouse cursor does not move in small steps but continuously in the indicated direction as soon as one of the cells around the 5 is selected.

When the mouse output function is active and the LED behind the 5 is lighted, you can switch between identical steps and continuous movement by selecting the *fun* key and the – from the numerical keypad. When the LEDs behind the 5 and the – are lighted, the continuous movement is switched on.



Adjustment of the cursor speed
The speed with which the cursor moves over the monitor, can be adjusted by first selecting the 5. One of the figures around 5 will now light up. This is a measure for the current speed: the figure 1 corresponds with a very low speed, figure 9 with a very high speed. By selecting another figure around the 5 the speed is modified and LUCY is immediately ready again for use. A suitable value for general use is 4.
Some users prefer to use the numbers from the top row to change the cursor speed instead of the num block. In the settings screen one can select the method used for cursor speed change.

Mouse clicking
Left or right mouse clicking corresponds with selecting respectively * or + in the numerical keypad of LUCY.

5. MOUSE OUTPUT (continued)

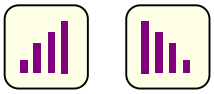
Double click
LUCY can imitate a mouse double click by selecting the concerned symbol twice in fast succession. If the required speed is a problem, you can put LUCY in the repeating mode with *rep* and then keep selecting the symbol till LUCY has sounded two small beeps. Selecting the *return* ↵ symbol on LUCY is a good alternative for a double click.

Dragging the mouse
Sometimes you have to move the mouse while keeping the mouse button pressed at the same time. You can imitate this so-called 'dragging' by first selecting *fun* and then one of the mouse button symbols (* or +). You can move the mouse cursor in the usual way along the screen. Selecting the mouse button once again ends the dragging. During the dragging, the LED behind the button will light up to indicate that dragging is selected.

Mousetrap
Sometimes it is difficult to find the mouse cursor on a busy display. The cursor can even run entirely of the screen. It seems then as if the mouse function is defective. Therefore LUCY has a function that brings the mouse cursor simply back to the middle of the screen. With the mouse function switched on, you select the 5 and then the – in the numerical box; the mouse cursor will jump to the middle of the screen. This function only works when the LUCY program is active. Otherwise LUCY will sound a double beep when you try to use this function.

6. CONTROL FUNCTIONS OVERVIEW

6.1 SPECIAL SYMBOLS

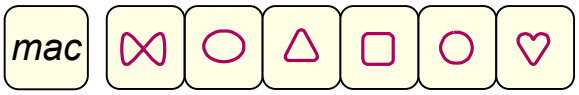


Speed or sensitivity

These symbols are used for adjusting the speed or sensitivity of the control method. With laser pointer control you can regulate the speed with which the characters react to the light spot. With mouse or Trackball control you can regulate the sensitivity and with switch control you can adjust the scan rate. Detailed information is given in chapter 3.

Repeating mode

When you select a character, it will be sent to the computer only once, no matter how long you hit the character. You can put LUCY in a repeating mode by selecting *rep*. In this mode the chosen character will be sent repeatedly to the computer as long as you keep the selection active. The LED behind *rep* will stay lit as long as the repeating mode is switched on. If you select *rep* once again, the repeating mode is switched off.
The repeat rate of the characters can be adjusted with Fun Rep. see page 24.



Macro symbols

It is possible to store frequently used words, sentences or control tasks in the memory of LUCY. Such a stored word or sentence is called a macro. The stored item can be called back with only one or two selections. Working with macros is simple and can save a lot of time. Chapter 4 contains a detailed explanation of the use of macros.

Function key

The function symbol is used to change certain settings of LUCY and also to use the function keys of a computer. After selecting the *fun* key, the LED behind it will light up to indicate that more characters or symbols must be selected. By selecting *fun* once again, LUCY returns to the normal mode and the LED will be extinguished. If you have activated a function accidentally and want to return to the normal mode, you can do so safely in most cases by selecting the *return* ↵ symbol.

The next pages list an alphabetical overview of all control functions.

6.2 FUNCTION KEYS OVERVIEW

fun *1* **till** *0* **Computer function keys F1 till F10**

These symbols correspond with the function keys F1 till F10 of the computer (where *fun* 0 stands for F10).

fun *1 end* **and** *2 ↓* **Computer function keys F11 and F12**

The function keys F11 and F12 can be selected with *fun* and the figures *1* and *2* of the numerical keypad.

fun *5* **Mouse output on/off**

With *fun* and the *5* of the numerical keypad the mouse output to the computer is switched on or off. After selecting *fun* and 5 the LED behind the 5 will light up as a sign that the mouse output is active. Once again selecting *fun* and *5* will switch the mouse output off and extinguish the LED. The use of the computer mouse with LUCY is explained extensively in chapter 5.

fun *alt* **Holding the Alt key**

After selection of *alt* and another symbol LUCY returns directly to the normal operating mode. This fits in with the usual way to work with the *alt* key. In (rare) cases where the *alt* key must be held while several other keys are pressed, you can use *alt* in combination with *fun*. The LED under *alt* stays lit and all following characters are sent to the computer as *alt* combinations. After selecting *alt* again, the LED will extinguish and LUCY returns to the normal mode.

fun *altgr* **Holding the Alt gr key**

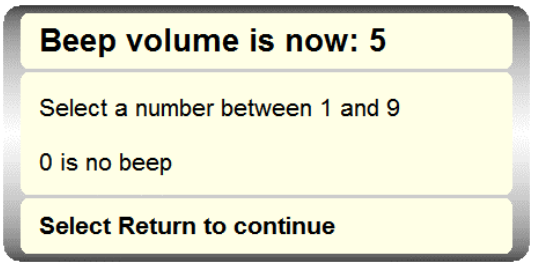
Like most modern keyboards LUCY has two *alt* keys, of which the right one is called *alt gr* (alt ground). The function of both keys depends on the program you work with. You can hold the *alt gr* key in the same way as the *alt* key.

6.2 FUNCTION KEYS OVERVIEW (continued)

fun *b*

Adjusting the beep

This function is used to adjust the loudness of the beep. During normal use LUCY gives a short beep as soon as a character has been accepted. With *fun* and *b* you can adjust the loudness of the beep by choosing a figure of 1 to 9. You can try several figures after each other to find the desired loudness.



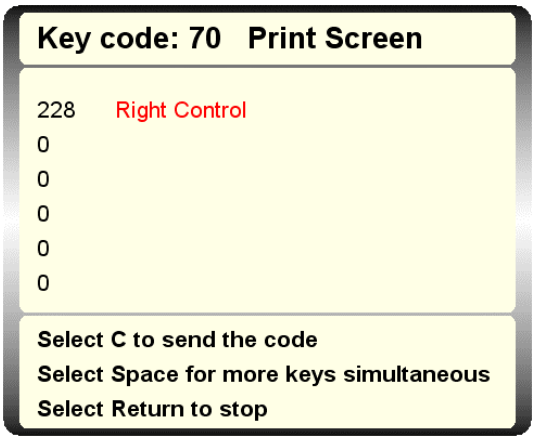
It is also possible to eliminate the beep entirely by choosing the figure 0. In that case you can still see whether the chosen character has been accepted by the lighting up of the concerned character. During adjustment of the beep, the current value is visible in the window. Selecting the *return* ↵ symbol brings you back to the normal operating mode.

fun *c*

To assign a key code for special keys

As the keyboard overlay of LUCY has less keys than a standard keyboard, not all keys are directly available. With *fun c* it is nevertheless possible to assign a key code for the missing keys, if needed up to six at the same time.

After selecting *fun* and *c* a small window appears. Each key can be emulated with a number between 0 and 255, the so-called key code. The English name of the concerned key appears in the upper part of the window. In the guide on the CD-Rom you will find an appendix with all key codes.



If required you can try several numbers in succession. After typing three figures the formation of a number starts again. As soon as the correct code has been introduced, this can be sent to the computer by selecting the *c*.
It is also possible to assign more than one key code at the same time. After the code for the first key has been typed, you select the space. The first code then appears on the first line in the window and the second code can be typed. This way up to six key codes can be assigned. After selecting *c* all codes are sent to the computer at the same time.

By placing *fun c* and the assignment of codes in a macro, you have to do this only once to have the concerned keys within easy reach.

6.2 FUNCTION KEYS OVERVIEW (continued)

fun *ctrl*

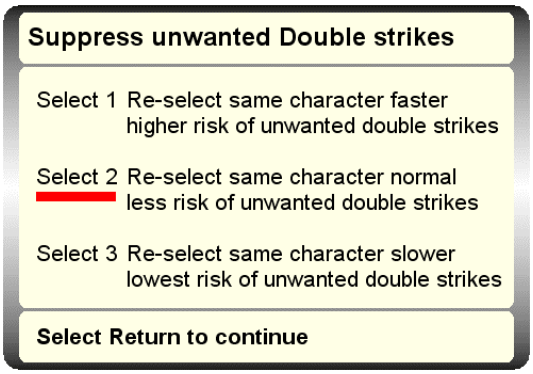
Holding the Ctrl key

After selection of *Ctrl* and any other symbol LUCY returns directly to the normal operating mode. This fits in with the usual way to work with the Ctrl key. In (rare) cases where the Ctrl key must be held while several other keys are pressed, you can use *Ctrl* in combination with *fun*. The LED under *Ctrl* stays lit and all following characters are sent to the computer as Ctrl combinations. After selecting *Ctrl* again, the LED will extinguish and LUCY returns to the normal mode.

fun *d*

To suppress unwanted double strikes

This function is only available with laser pointer control. Sometimes a double character appears on screen although seemingly the character was only selected once. There is a simple explanation: when the light spot moves very rapidly from one character to the next, it sometimes overshoots the target character slightly before it comes to rest on the character, thus hitting and selecting it twice. This phenomenon is generally imperceptible for the eye but nevertheless occurs, especially in case of large and fast movements. To reduce unwanted double strikes you can increase the so-called double strike pause.


Suppress unwanted Double strikes
Select 1 Re-select same character faster
higher risk of unwanted double strikes
Select 2 Re-select same character normal
less risk of unwanted double strikes
Select 3 Re-select same character slower
lowest risk of unwanted double strikes
Select Return to continue

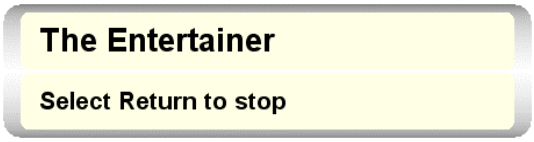
To select a character twice, the light spot has to leave the character and then return to it. The minimal time between the first and the second hit is called the double strike pause. This pause can be adjusted with *fun d*. After selecting *fun* and *d* a small screen appears in which a new value 1, 2 or 3 can be chosen. The LED behind the *return* ↵ symbol blinks as a sign that LUCY is waiting for a new setting. The larger the number, the longer the double strike pause will be. To fix the setting, you have to select *return* ↵. The most usual value for the pause is 2. A value of 1 has the advantage of faster selecting double characters. The disadvantage is a larger chance of unwanted double strikes. At a value of 3 one must wait somewhat longer before a character can be chosen once again, but the chance of unwanted double strikes is smallest.

6.2 FUNCTION KEYS OVERVIEW (continued)

fun *e*

Entertainer

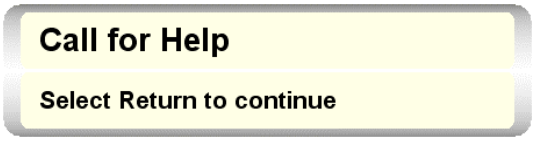
After selection of *fun* and *e*, LUCY will play "The entertainer" as a musical interlude. It can be switched off by selecting *return* ↵.



fun *h*

Call for help

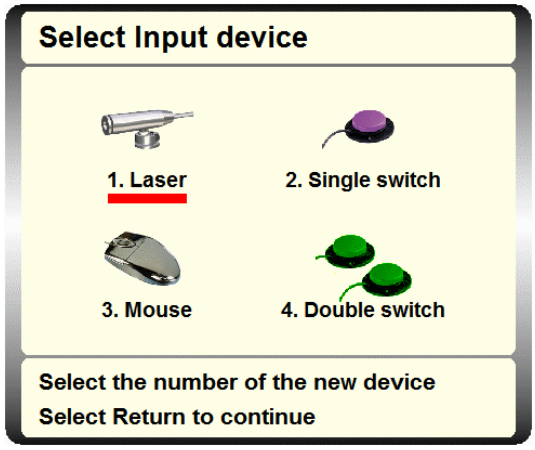
This function switches on the call for help. After selecting *fun* and *h*, a loud alarm sounds and a text appears on screen. As long as the call for help is selected, all keys are insensitive except the *return* ↵ symbol. The alarm can be switched off by selecting *return* ↵.



fun *i*

Input device

With *fun i* another input device can be chosen. After selection of *fun* and *i* a screen appears with the available possibilities. The desired method is chosen with a number.
After selecting a new number and *return* ↵, another window appears on the monitor with a slowly shortening blue beam. You now have approximately 15 seconds to select the *return* ↵ symbol with the new device, to implement your choice.

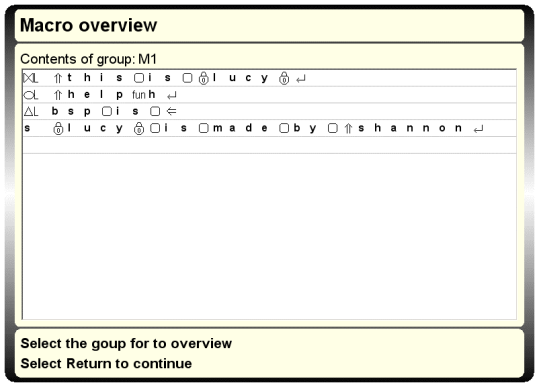


If you don't do this in time, LUCY will return to the old situation and the input device remains unaltered. This is to ensure that the new input device can be used effectively.

fun *m*

Macro overview

With *fun* and m you can call up a window with an overview of all available macros. The use of macros is extensively discussed in chapter 4.

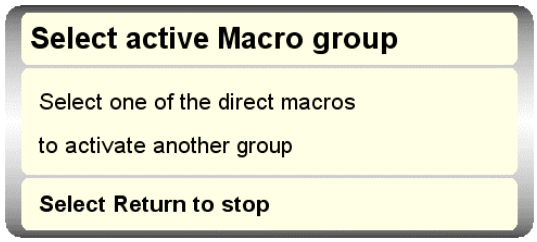


6.2 FUNCTION KEYS OVERVIEW (continued)

fun *mac*

To choose a macro group

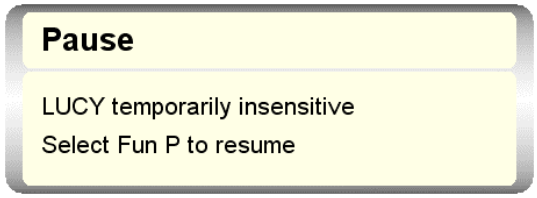
By selecting *fun* and *mac* and one of the macro symbols, you activate one of the 11 possible macro groups. This function only works if the LUCY program in the computer is active. The use of macros is extensively discussed in chapter 4.



fun *p*

Pause

This function is only available with laser pointer control. After selecting these symbols LUCY becomes temporarily insensitive for the light spot. An information message appears on the screen. The LEDs behind the *fun* and *p* will light up as a sign that LUCY does not work normally. After four seconds the screen message disappears, so the entire screen can be read.

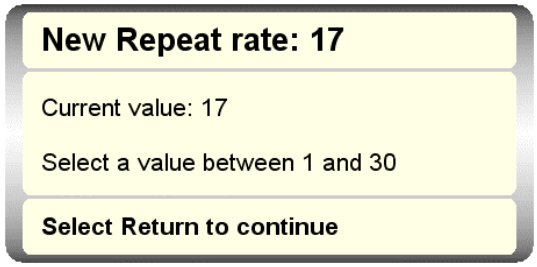


This way one can prevent uncontrolled selection of random characters during a rest pause. By selecting *fun* and *p* once again LUCY will return to the normal operating mode.

fun *rep*

To adjust the repeating speed

With the *rep* symbol LUCY can be placed in the repeating mode: a selected character is sent to the computer repeatedly as long as character stays selected. The speed with which the characters are sent can be adjusted with *fun* and *rep*. The current value is visible in a small window on the screen. The higher the value, the faster the characters will succeed each other. With *return* ↵ you go back to the normal situation.



6.2 FUNCTION KEYS OVERVIEW (continued)

fun *s* **Pressing Scroll Lock key**

Although the Scroll Lock key on the standard keyboard is used only seldom, the function is also available on LUCY by choosing *fun* and *s*. As long as Scroll Lock is active, the LED behind s will stay lit. After once again selecting *fun* and *s*, LUCY returns to the normal mode.

fun *shift* **Holding the Shift key**

After selecting the *shift* symbol the next character will be sent to the computer as a capital letter. As soon as the character is accepted, the LED behind the *shift* key will extinguish and the next characters will be sent as lower case letters. This fits in with the usual way to work with the *shift* key: a capital letter at the beginning of the sentence and afterwards small characters. If you want several capital letters in a row, you can use the combination of *fun* and *shift*. The LED under shift stays lit then and all following characters are sent to the computer as capital letters. After again selecting *shift* the LED extinguishes and LUCY returns to the normal mode.

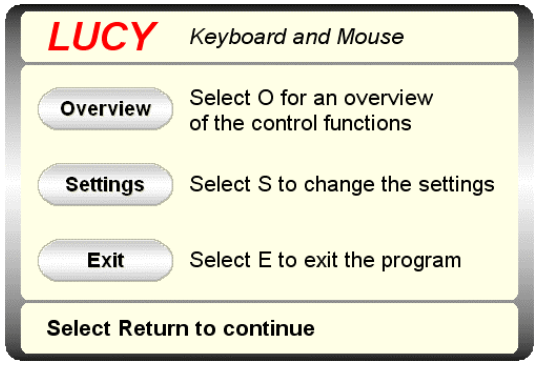
fun *x* **To call up the LUCY main window**

After selection of *fun* and *x* the main window of the LUCY program appears on screen. You can now choose from 3 characters:

O for calling up a compact overview of all the control functions.

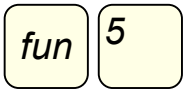
S to go to the settings screen of LUCY. By way of this window you can also choose another user profile.

E to stop the LUCY program.



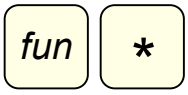
With *return* ↵ you can return to the normal operating mode. The different possibilities are described more extensively in chapter 7.

6.3 MOUSE CONTROL FUNCTIONS OVERVIEW



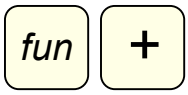
Switching mouse output on/off

With *fun* and *5* of the numerical keypad, the mouse output to the computer is switched on or off. After selecting *fun 5* the LED behind the 5 will light up as a sign that the mouse output is active. After once again selecting *fun 5* the LED will extinguish and the mouse output is no longer active. The use of the computer mouse with LUCY is extensively discussed in chapter 5.



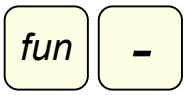
Dragging with the left mouse button

In some cases it is necessary to hold the mouse button while the mouse is moved. After selecting *fun* and * the LED behind * lights up as a sign that the left mouse button has been fixed. Selecting *fun* * once again extinguishes the LED and brings LUCY back to the normal mode.



Dragging with the right mouse button

In some cases it is necessary to hold the mouse button while the mouse is moved. After selecting *fun* and + the LED behind + lights up as a sign that the right mouse button has been fixed. Selecting *fun* + once again extinguishes the LED and brings LUCY back to the normal mode.



Mouse output type

Using mouse output with LUCY, you can choose between two possible control methods; continuous or with identical steps. If the mouse output is active and the LED behind – is lit, the mouse cursor will move in a continuous motion along the screen as long as one of the arrows of the numerical keypad is selected. If the LED behind – is not lit, the mouse cursor will make identical small steps when one of the arrows in the numerical box is selected. Both methods have their advantages and disadvantages. To switch between the methods select *fun* and -.

7. THE COMPUTER PROGRAM LUCY

7.1 THE MAIN WINDOW

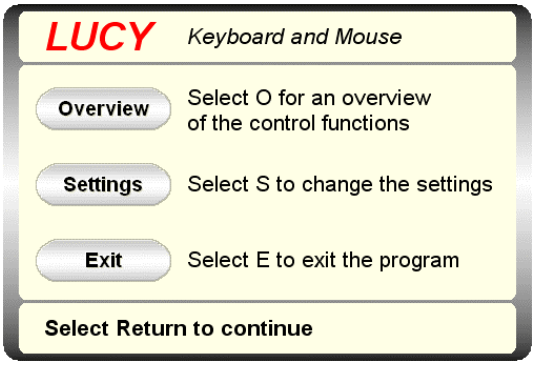
With LUCY a special computer program is provided. Although LUCY functions as a fully-fledged keyboard and mouse without this program, installing the program on the computer offers a number of advantages. The help windows described in the previous chapters, will appear only when the program is active. The number of macros that can be used, can be extended indefinitely by using the program. Moreover the settings of LUCY can be stored separately for each user. And finally the program offers an overview of all control functions available in LUCY, with a concise description.

The program can only be started when LUCY is connected to the computer.

In most cases the program is installed automatically when you place the supplied CD-Rom in the computer. When the installation program does not start automatically, you go to the CD-Rom player with Windows Explorer and then double click the Setup icon. You read further instructions on the screen.

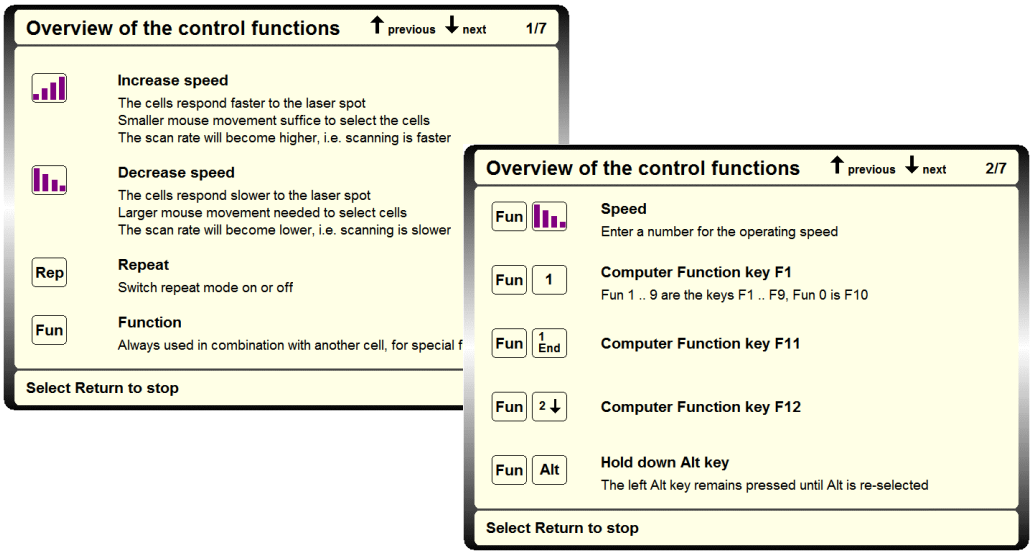
When the LUCY program is active, the LUCY icon stands in the lower right corner of the screen near the clock. By clicking the icon or by selecting successively *fun* and *x* on LUCY the main window of the program is shown.

In this window you can select O for calling up a compact overview of all the control functions. Choose S to go to the adjustment screen of LUCY. By selecting E you can stop the LUCY program. With *return* ↵ you can return to the normal operating mode; the main window will close down, but the program remains active.



7. 2 CONTROL FUNCTIONS OVERVIEW

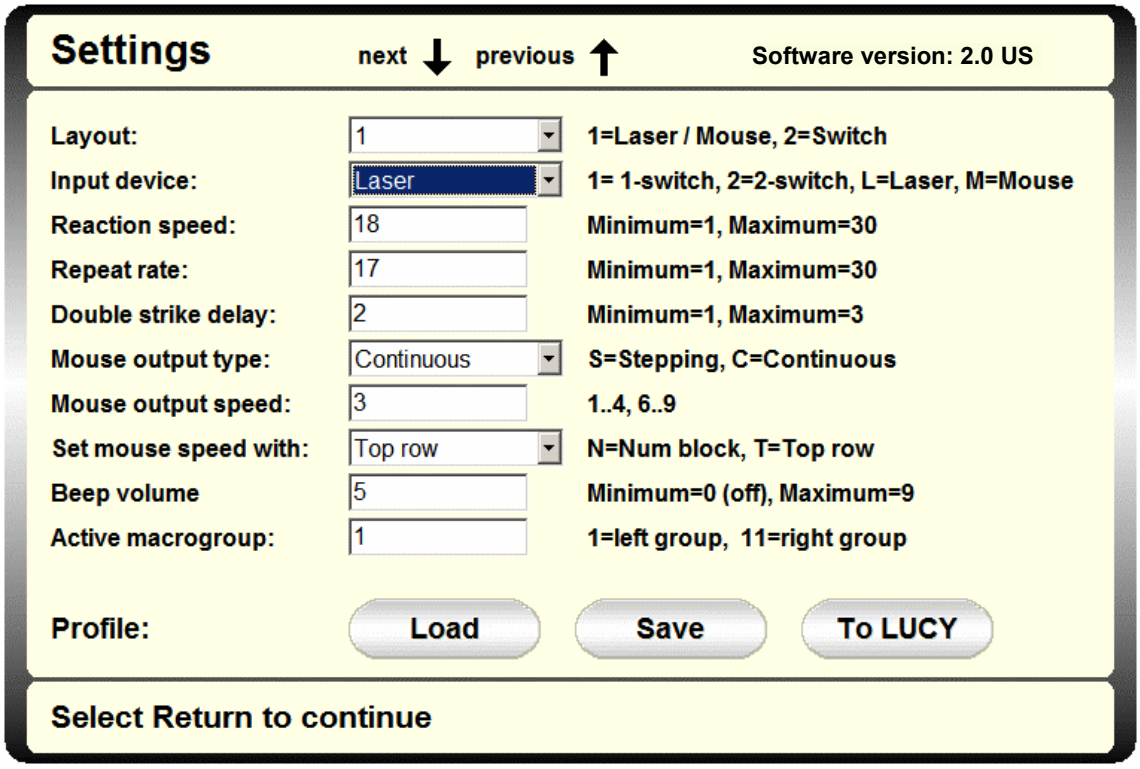
The overview contains a number of information windows in which is concisely described which control functions are available in LUCY.


Overview of the control functions
previous
next
1/7
Increase speed
The cells respond faster to the laser spot
Smaller mouse movement suffice to select the cells
The scan rate will become higher, i.e. scanning is faster
Decrease speed
The cells respond slower to the laser spot
Larger mouse movement needed to select cells
The scan rate will become lower, i.e. scanning is slower
Rep
Repeat
Switch repeat mode on or off
Fun
Function
Always used in combination with another cell, for special f
Select Return to stop
Overview of the control functions
previous
next
2/7
Fun
Speed
Enter a number for the operating speed
Fun 1
Computer Function key F1
Fun 1 .. 9 are the keys F1 .. F9, Fun 0 is F10
Fun 1 End
Computer Function key F11
Fun 2
Computer Function key F12
Fun Alt
Hold down Alt key
The left Alt key remains pressed until Alt is re-selected
Select Return to stop

With the arrow keys 2↑ and 8↓ you can scroll through the different screens. With *return* ↵ the overview is closed and the program returns to the main window.

7.3 SETTINGS

When the S is selected in the main window, the settings screen is opened. Top right you see the current program version.



7.3 SETTINGS (continued)

All user settings of LUCY can be viewed and changed in this screen. Most of these settings can also be changed using LUCY functions as described in earlier chapters. This screen is intended especially for therapists who want to adapt LUCY rapidly for several users. The one setting that can only be changed by means of this screen is that for the keyboard overlay. The overlay cannot be selected by any LUCY function.

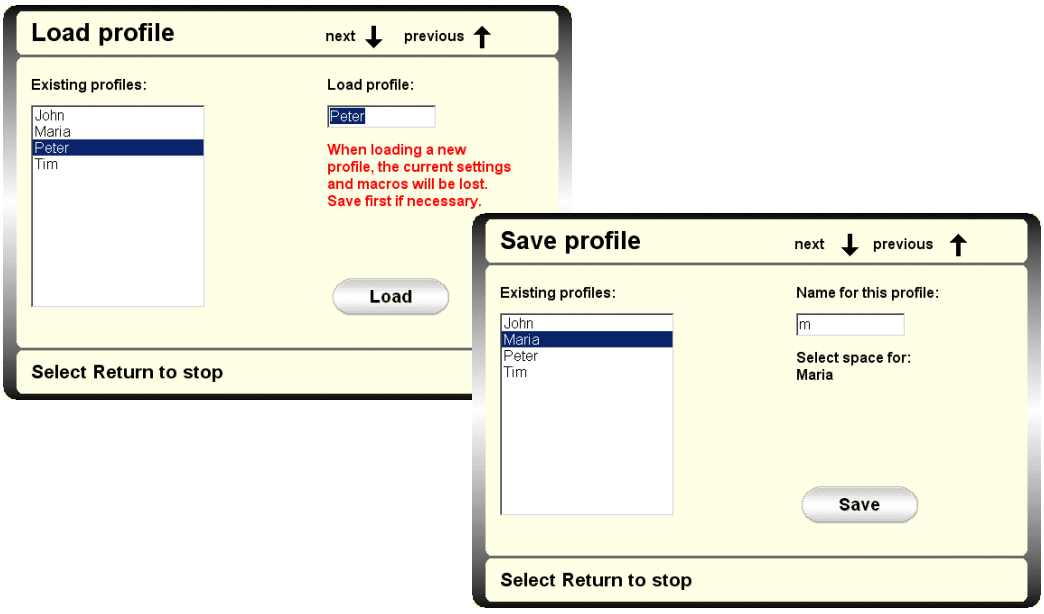
The values shown in the settings screen correspond with the current values in LUCY. Using the arrow keys 2↑ and 8↓ you can jump to the following or the previous box. After the last box you reach the switch buttons. The selected button colours red. The button can be pressed by clicking on it with the mouse or by selecting the space.

To activate new settings you have to click on the button *To LUCY*. The program then asks to confirm the settings by selecting *return* ↵. This is possible both with LUCY and with the ordinary keyboard. If you don't select *return* ↵ within a certain time, a double beep will sound, and the current settings will remain unchanged.

NB If you select *return* ↵ without the programme asking for it, the settings window is closed and the old settings remain unchanged.

7.4 USER PROFILES

It is possible to store all individual settings including macros and macro groups for each user in a so-called user profile. With the button *Save* a profile can be stored on the hard disk of the computer. With the button *Load* an earlier stored profile can be chosen from the list of existing profiles.

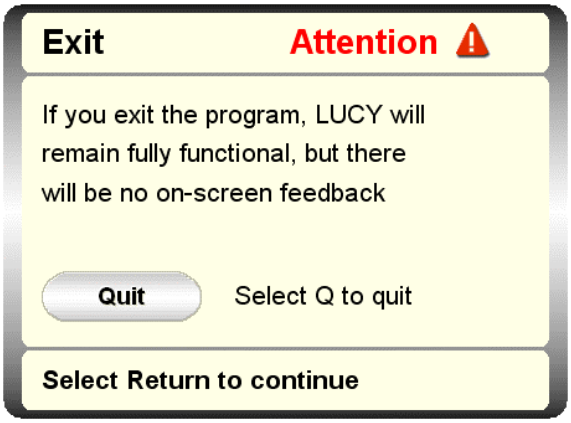


The arrow keys 2↑ and 8↓ can be used to jump between the boxes and to select the buttons *Save* or *Load*.

7.5 TO CLOSE THE PROGRAM

After clicking the Exit button or selecting an E in the main window of the program a warning window appears on screen.

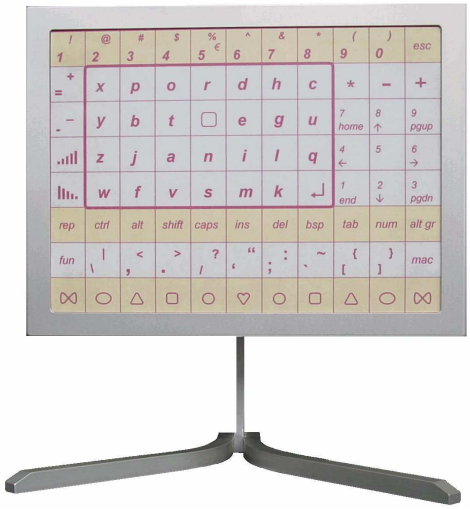
If you clicked the E accidentally, you can return to the main window by selecting *return* ↵. By choosing a Q in the warning window or by clicking on Quit, the LUCY program is closed down and no more information screens of the program will appear on the monitor. LUCY continues to function, however, as an ordinary keyboard and mouse.


Exit
Attention
If you exit the program, LUCY will remain fully functional, but there will be no on-screen feedback
Quit
Select Q to quit
Select Return to continue

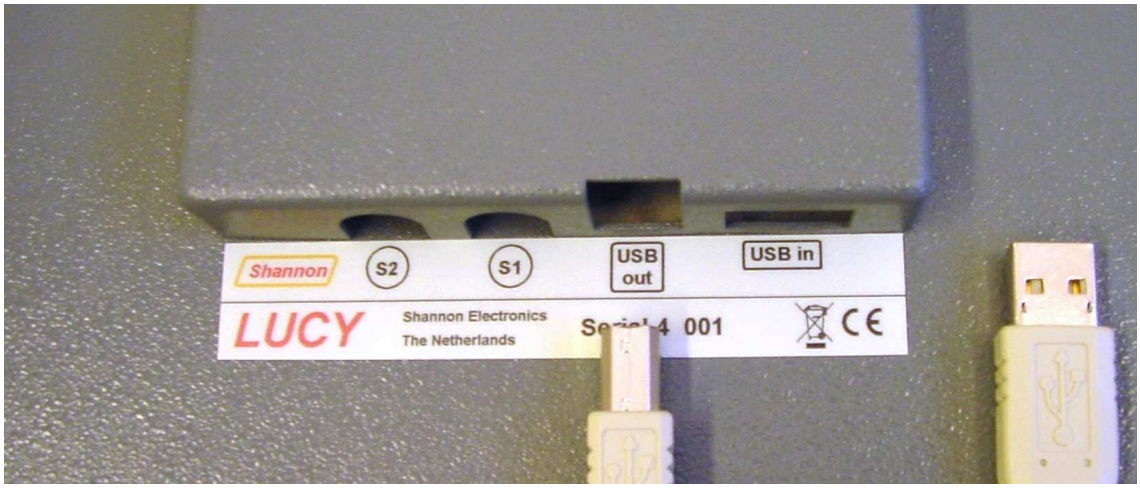
8. INSTALLING AND CONNECTING LUCY

8.1 INSTALLING LUCY

Mount the LUCY on the table stand and put it next to the computer monitor. An assembly guide is enclosed in the packaging of the stand.



8.2 CONNECTING LUCY



THE USB port is located at the back of LUCY.
Put the square connector of the supplied USB cable in this port. Put the other end of the cable in a free USB port of the computer.

When LUCY is used with a mouse or a trackball, this apparatus should be connected to the port *USB in* at the back of LUCY.

The standard 3.5 mm connection S1 is intended for one-switch control.

With two-switch control, S1 is used for the row-switch and S2 is used to connect the character-switch.

8.3 HARDWARE INSTALLATION

As soon as LUCY is linked to the computer, in Windows XP and in Vista systems the text 'new hardware found' will pop up. The computer recognises LUCY automatically.

LUCY is a complex device. When LUCY is connected for first time, the PC will recognise four different devices: a composite device, a keyboard, a mouse and finally a data processing device.

After a short time the text 'your new hardware is ready for use' will appear. This indicates that the hardware has been installed successfully.

When LUCY is connected to a Windows 98 PC, you may be asked to insert the original installation CD of Windows. If this CD is not available, usually a successful installation can be reached by clicking on 'Skip this file', because the required standard drivers of Windows are often already present in the computer.

CE declaration of conformity

The manufacturer	Shannon Electronics vof Gebrokenwit 1, 2718 AX Zoetermeer, The Netherlands

declares under exclusive responsibility that the product

Name and type:	LUCY 4
Description:	Communication aid for physically handicapped people

has been designed, produced and tested according to the following harmonized standards for Information Technology Equipment

EN55022:2006	Radio Disturbance Characteristics
EN55024:1998/2003	Immunity Characteristics

and is in compliance with all essential requirements of EMC directive 2004/108/EG.

date:	September 1, 2007
name:	J. Goezinne
title:	director
signature:	J Goezinne

APPENDIX 1. KEY CODES

CODE	KEY	CODE	KEY
1	Overrun Error	51	; :
2	POST Fail	52	"
3	ErrorUndefined	53	` ~
4	a A	54	, <
5	b B	55	. >
6	c C	56	/ ?
7	d D	57	Caps Lock
8	e E	58	F1
9	f F	59	F2
10	g G	60	F3
11	h H	61	F4
12	i I	62	F5
13	j J	63	F6
14	k K	64	F7
15	l L	65	F8
16	m M	66	F9
17	n N	67	F10
18	o O	68	F11
19	p P	69	F12
20	q Q	70	Print Screen
21	r R	71	Scroll Lock
22	s S	72	Pause
23	t T	73	Insert
24	u U	74	Home
25	v V	75	Page Up
26	w W	76	Delete
27	x X	77	End
28	y Y	78	Page Down
29	z Z	79	Right Arrow
30	1 !	80	Left Arrow
31	2 @	81	Down Arrow
32	3 #	82	Up Arrow
33	4 $	83	Num Lock
34	5 %	84	Keypad /
35	6 ^	85	Keypad *
36	7 &	86	Keypad -
37	8 *	87	Keypad +
38	9 (	88	Keypad Enter
39	0)	89	Keypad 1 End
40	Return	90	Keypad 2 Down
41	Escape	91	Keypad 3 PgDn
42	Backspace	92	Keypad 4 Left
43	Tab	93	Keypad 5
44	Space	94	Keypad 6 Right
45	- _	95	Keypad 7 Home
46	= +	96	Keypad 8 Up
47	[{	97	Keypad 9 PgUp
48	] }	98	Keypad 0 Insert
49	\ |	99	Keypad . Delete
50	Europe 1	100	Europe 2

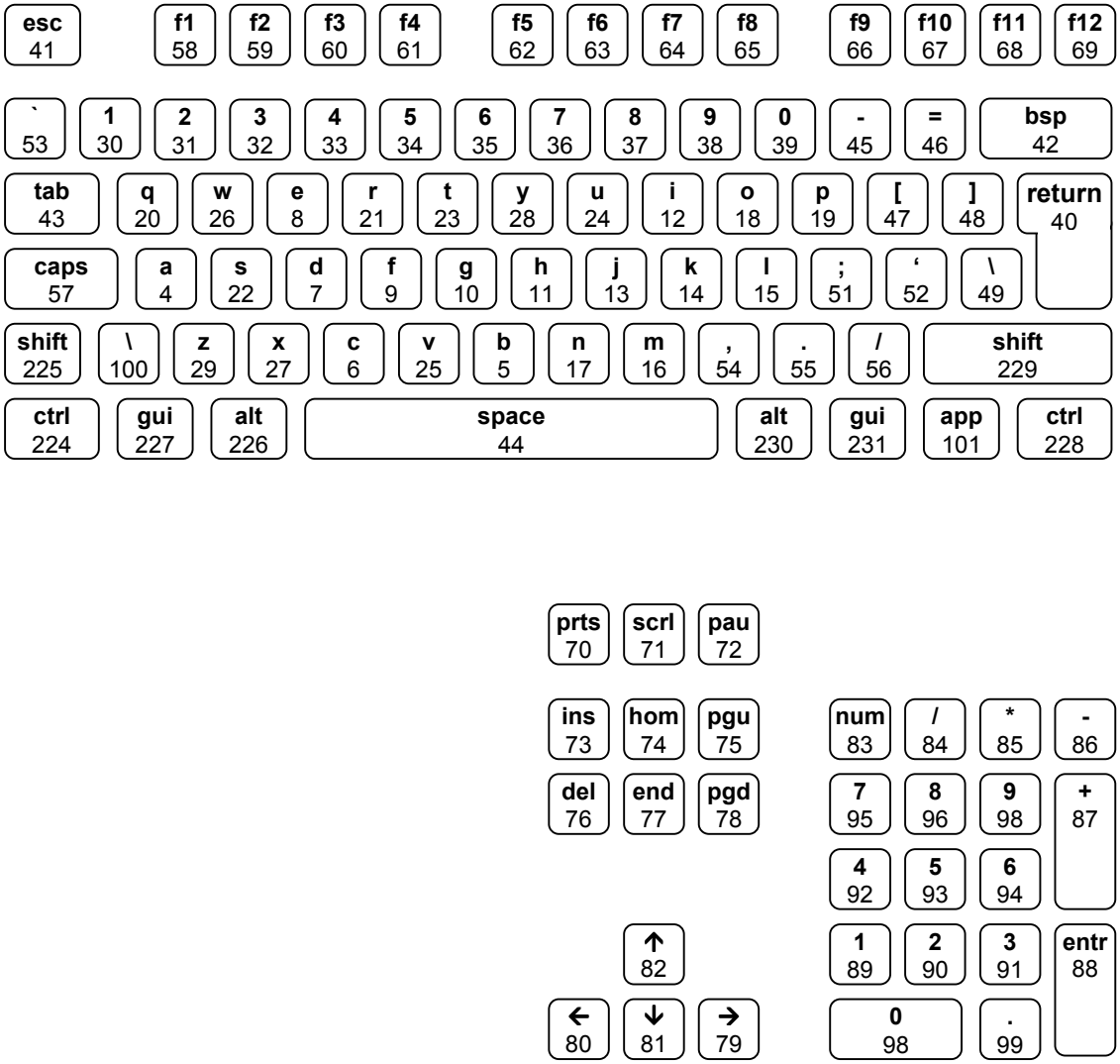
APPENDIX 1. KEY CODES (continued)

CODE	KEY
101	App
102	Keyboard Power
103	Keypad =
104	F13
105	F14
106	F15
107	F16
108	F17
109	F18
110	F19
111	F20
112	F21
113	F22
114	F23
115	F24
116	Kbd Execute
117	Kbd Help
118	Kbd Menu
119	Kbd Select
120	Kbd Stop
121	Kbd Again
122	Kbd Undo
123	Kbd Cut
124	Kbd Copy
125	Kbd Paste
126	Kbd Find
127	Kbd Mute
128	Kbd Volume Up
129	Kbd Volume Dn
130	Kbd Locking Caps Lock
131	Kbd Locking Num Lock
132	Kbd Locking Scroll Lock
133	Keypad , '
134	Kbd Equal Sign
135	Kbd Int 1
136	Kbd Int 2
137	Kbd Int 3
138	Kbd Int 4
139	Kbd Int 5
140	Kbd Int 6
141	Kbd Int 7
142	Kbd Int 8
143	Kbd Int 9
144	Kbd Lang 1
145	Kbd Lang 2
146	Kbd Lang 3
147	Kbd Lang 4
148	Kbd Lang 5
149	Kbd Lang 6
150	Kbd Lang 7

CODE	KEY
151	Kbd Lang 8
152	Kbd Lang 9
153	Kbd Alternate Erase
154	Kbd SysReq/Attention
155	Kbd Cancel
156	Kbd Clear
157	Kbd Prior
158	Kbd Return
158	Kbd Separator
160	Kbd Out
161	Kbd Oper
162	Kbd Clear/Again
163	Kbd CrSel/Props
164	Kbd ExSel
165 / 223	RESERVED
224	Left Control
225	Left Shift
226	Left Alt
227	Left GUI
228	Right Control
229	Right Shift
230	Right Alt
231	Right GUI
232 / 255	RESERVED

APPENDIX 1. KEY CODES (continued)

STANDARD KEYBOARD LAYOUT



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